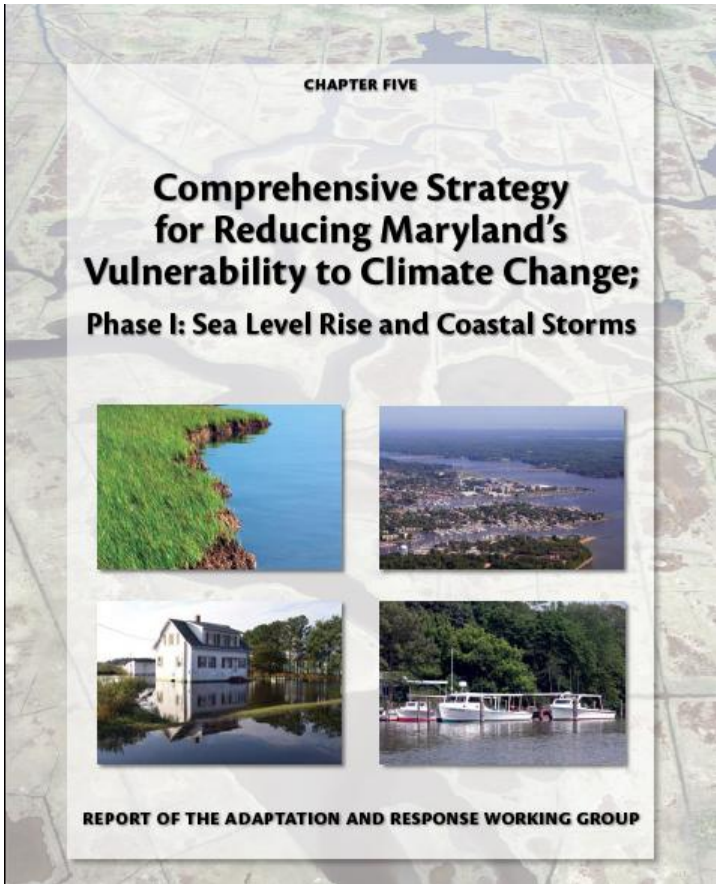
# Coastal Conservation & Climate Change Workshop

December 2, 2009

Chelsie Papiez
NOAA Coastal Fellow Maryland DNR

Patuxent Research Refuge National Visitors Center

# Toward a Vision for Maryland

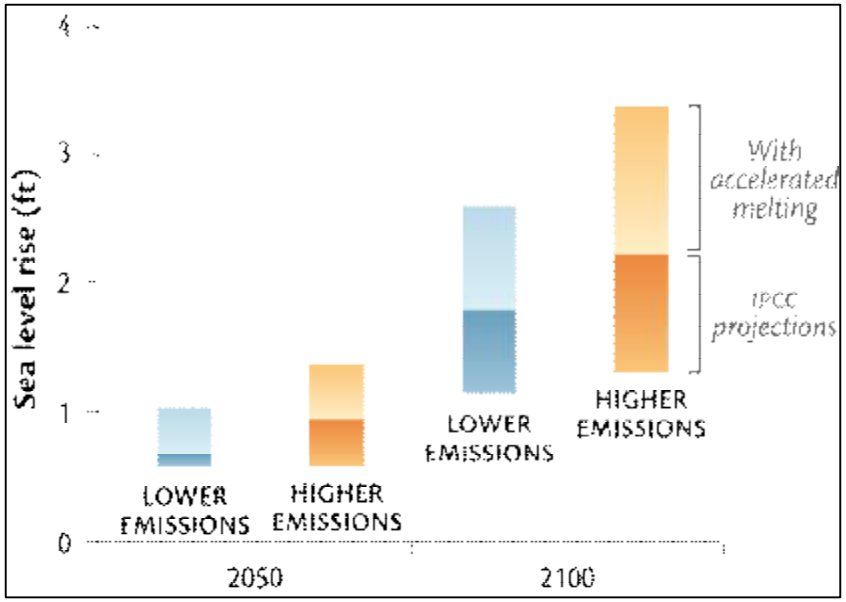


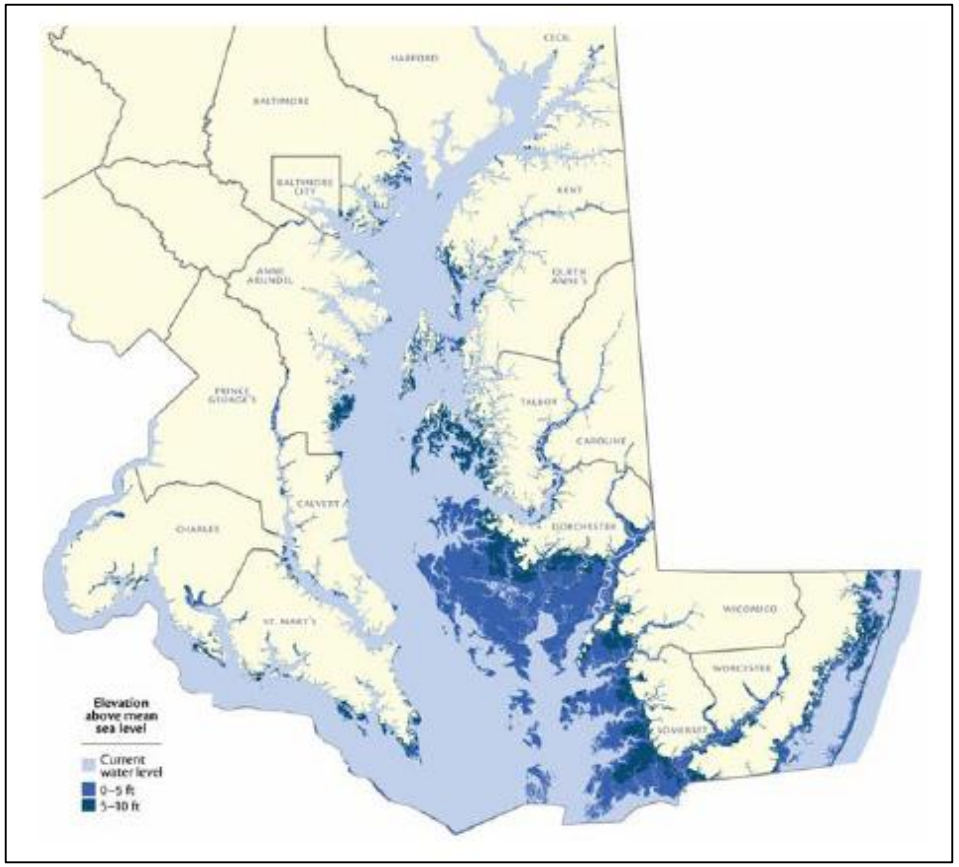

"We must take action now to plan for the impacts of climate change."

*Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change*

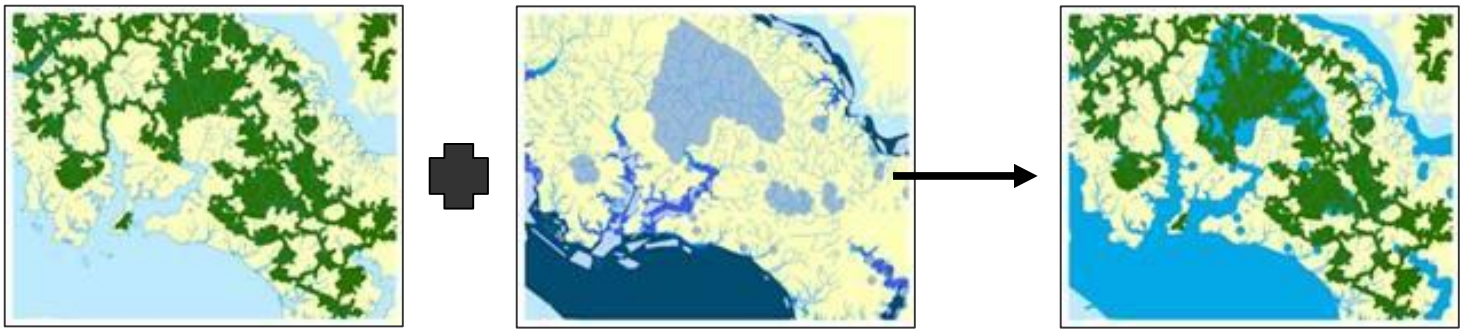
August 2008

# Maryland's Risk to Sea Level Rise




[1] MD Scientific & Technical Working Group Report, MCCC, 2008



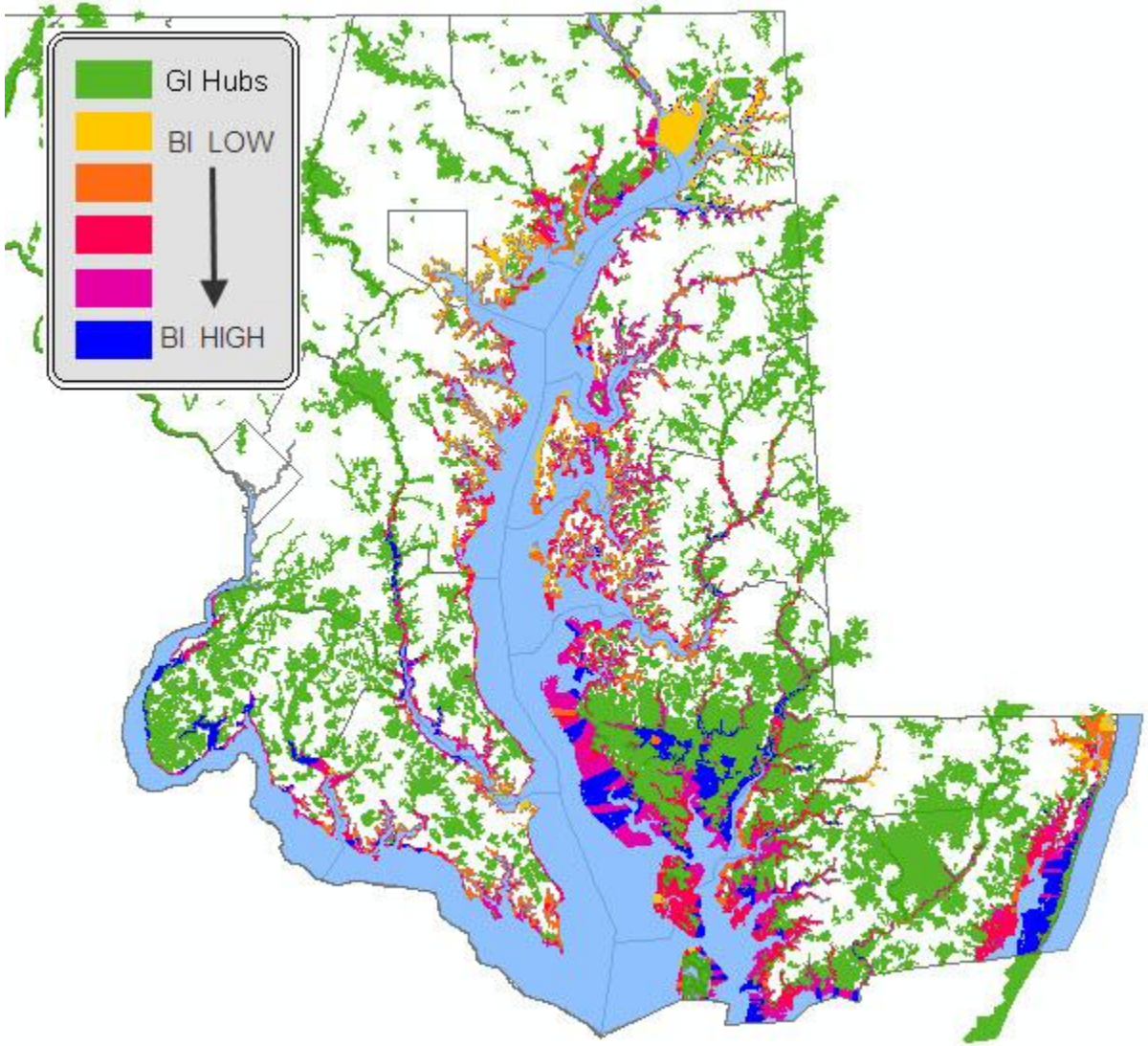
Green Infrastructure

Blue Infrastructure

Complete Ecological Network

A linked Green and Blue Infrastructure help Maryland to identify the critical land-water connections that need conservation or management action taken to maintain ecosystem services and conserve valuable coastal habitats and living resources.

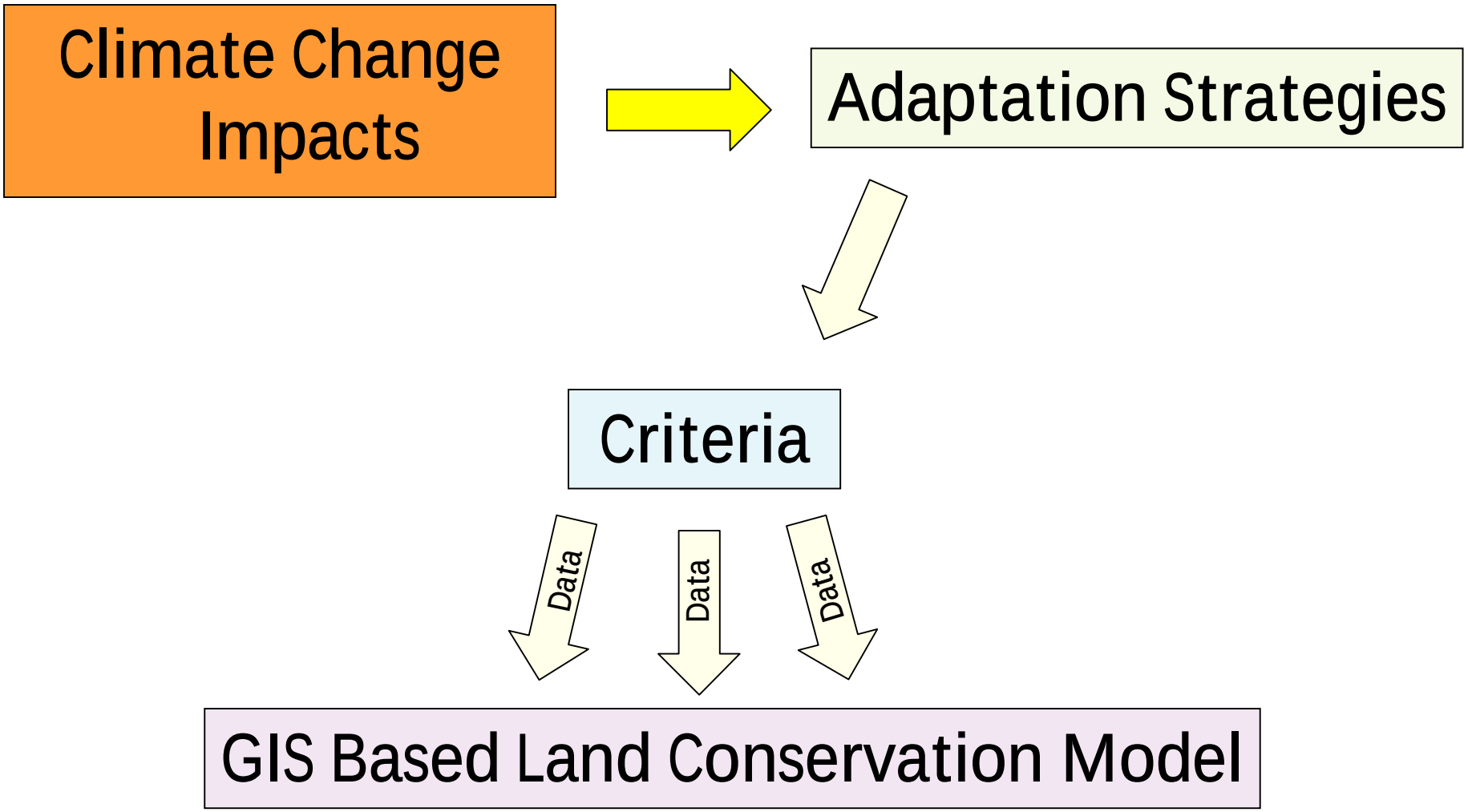
# Adapting Coastal Land Conservation Practices



# Adapting Coastal Land Conservation Practices

- Climate change poses an imminent threat to Maryland's low-lying lands and coastal resources.
- We must protect vulnerable lands under future climate change scenarios in order to protect human habitat and create and maintain resilient ecosystems.
- Land conservation can serve as a tool for adapting to sea level rise and reducing vulnerability.
- There is a need for new or enhanced land conservation targeting frameworks to take into account climate change impacts and identify adaptation opportunities.

# Adapting Coastal Land Conservation Practices



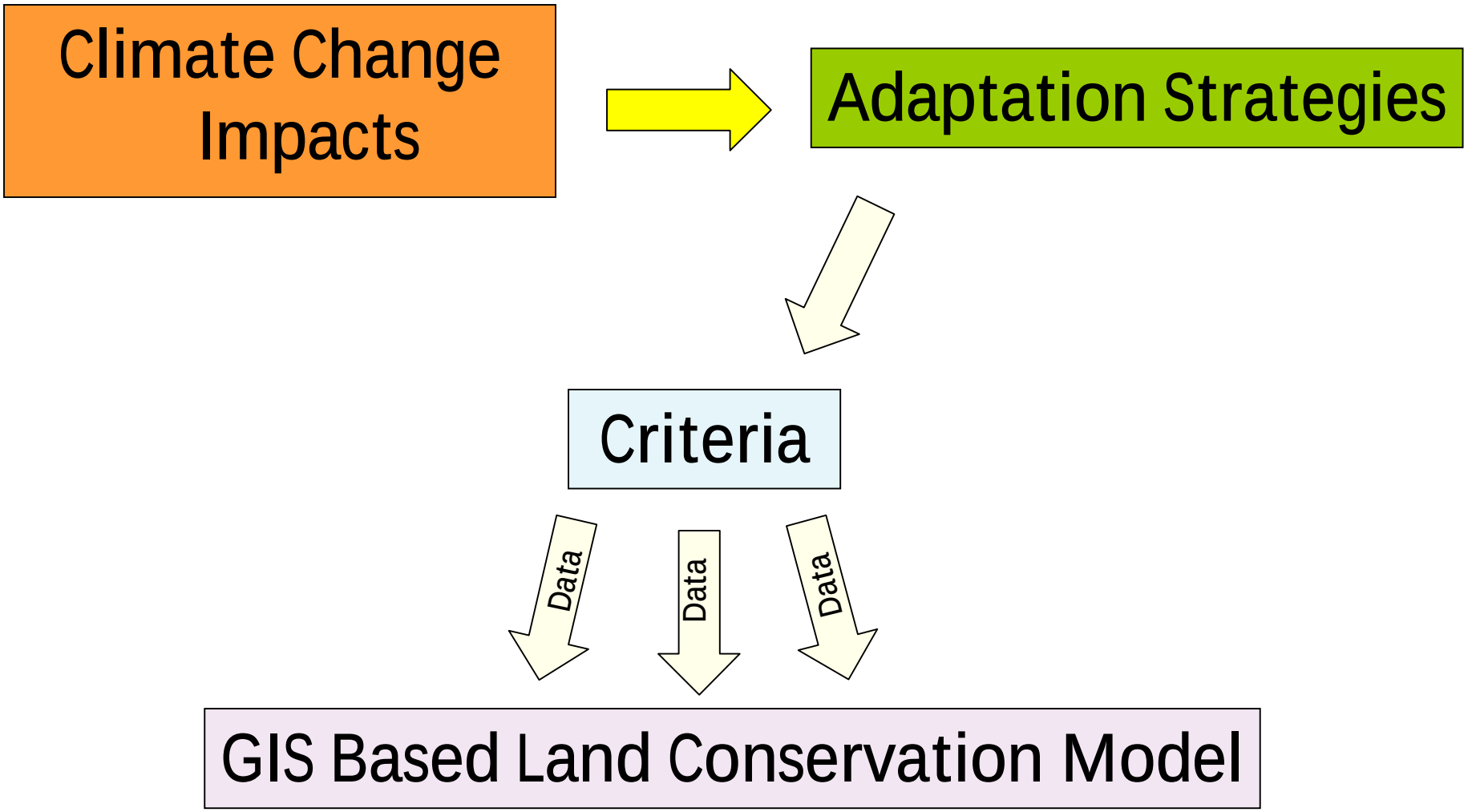
# Adapting Coastal Land Conservation Practices

## Climate Change Impacts

In order to begin we must know:

- Potential Coastal Impacts
  - Inundation, sea level rise, salt water intrusion, shoreline erosion, species range shifts, increased storm surge events, flooding, changes in precipitation etc.

# Adapting Coastal Land Conservation Practices



# Adapting Coastal Land Conservation Practices

## Adaptation Strategies

- Short to long-term actions, policies and/or management practices to reduce the vulnerability of natural and human systems to anticipated impacts of climate change.

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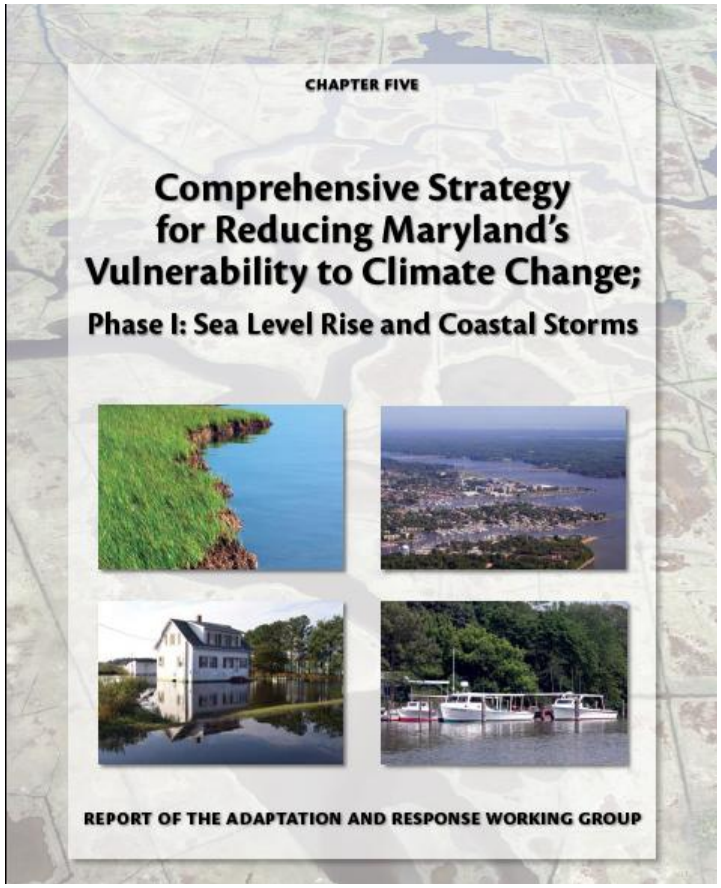
## Adaptation Strategies

- Short to long-term actions, policies and/or management practices to reduce the vulnerability of natural and human systems to anticipated impacts of climate change.
- The objective of many adaptation strategies is to reduce vulnerability by enhancing or increasing the resiliency of natural or human-systems to accommodate or withstand change over time.
- In the context of coastal land conservation, adaptation strategies can be implemented through land conservation practices (i.e., preserving wetland or habitat migration corridors).

# Adapting Coastal Land Conservation Practices

## Identified Adaptation Strategies

- Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change: Phase I
- Literature Review



# Identified Adaptation Strategies

## Sector Based Adaptation Strategies

- *Human Habitat & Health*
  1. Expand/Protect Natural Flood Storage Areas
  2. Increase and Preserve Natural Vegetated/Dune Buffers that Protect Inland Areas from Storm Surge
  3. Preserve Potential Residential Relocation Areas
  4. Facilitate Site Reclamation in the Face of Immediate Hazards (i.e. removal of septic systems)
  5. Protect Potable Water Supply

- *Resource Based Industries*
  1. Sustain Tourism & Outdoor Recreational Opportunities
  2. Provide Upland Relocation and Access Opportunities
  3. Maintain Public Access to Beaches, Waterways & Open Space
  4. Promote Aquaculture Development in Suitable Areas
  5. Protect Spawning & Nursery Habitats Under Future Conditions

- *Agriculture*
  1. Protect Soil Resources
  2. Maintain Adequate Area for Agricultural Production
  3. Reduce Nutrient and Sediment Runoff
  4. Provide Demonstration Areas to Investigate Food Production Alternatives
  5. Protect Freshwater Resources

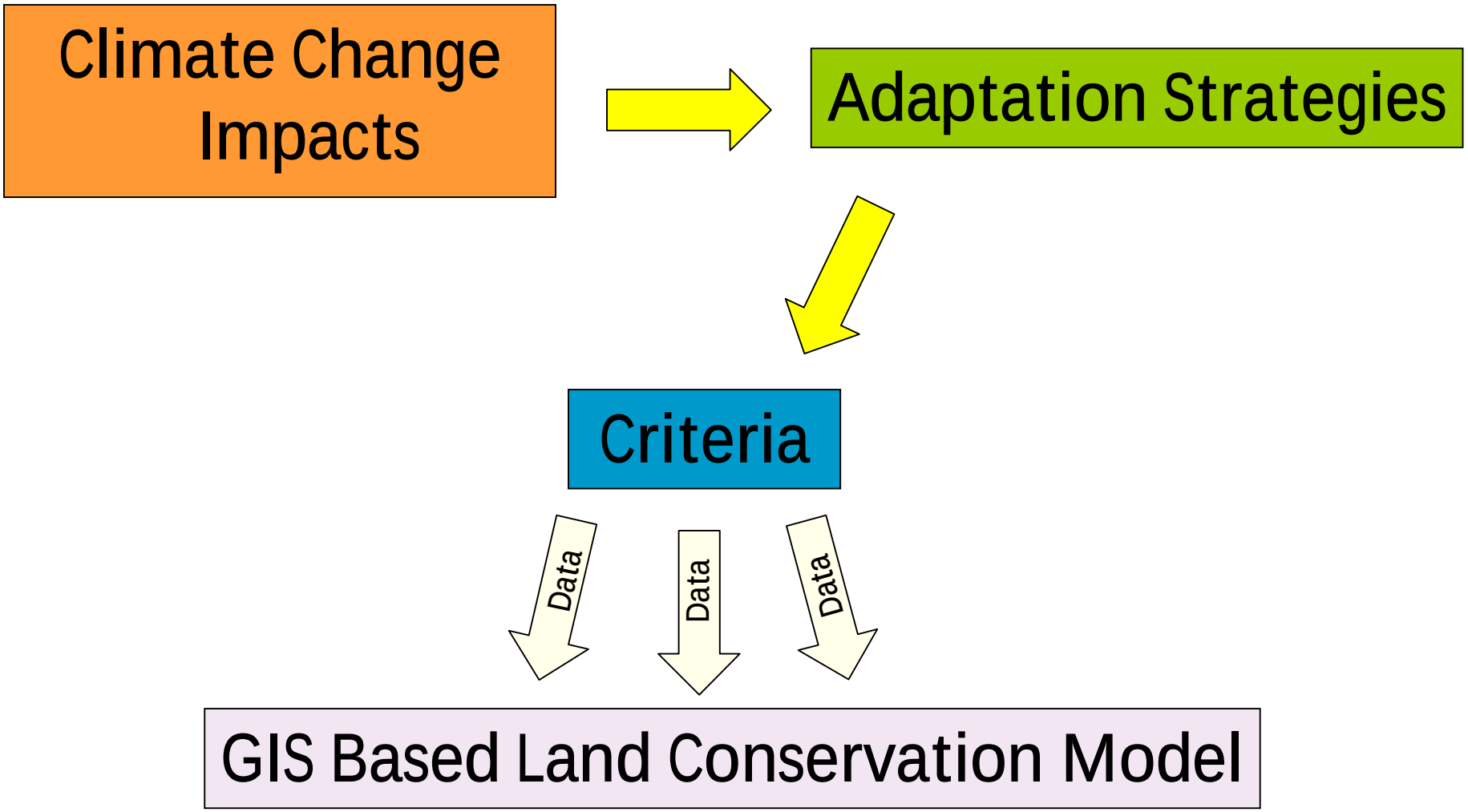
# Identified Adaptation Strategies

## Sector Based Adaptation Strategies

- *Aquatic & Terrestrial Ecosystems*
  1. Preserve Terrestrial Habitat Migration Corridors
  2. Maintain Suitable Habitat for Threatened & Endangered species (i.e. refugia/relocation/replication areas)
  3. Protect Areas Adjacent to Shoreline Habitats
  4. Facilitate Landward Movement of Coastal Ecosystems Subject to Dislocation by Sea-level Rise
  5. Conserve Riparian Corridors to Accommodate Increased Flooding and Maintain Water Temperatures
  6. Protect Native Biodiversity Hotspots and Representative Habitat Areas

- *Transportation & Land Use*
  1. Prevent Ecosystem Fragmentation (e.g. placement of barriers that would inhibit wetland/habitat migration)
  2. Preserve Human Settlements and Other Historic and Cultural Properties
  3. Maintain Integrity & Connectivity through Corridors
  4. Facilitate Planned Abandonment/Retreat of Vulnerable Coastal Areas
  5. Conserve Habitats that Sequester Carbon
  6. Prevent Development in High Risk Coastal Areas

# Adapting Coastal Land Conservation Practices



# Adapting Coastal Land Conservation Practices

## Criteria

- Specific landscape- or site-level characteristics and/or features which can be used to evaluate and target the application of select adaptation strategies on-the-ground.
- The development of criteria will provide land conservation partners a technical framework for assessing climate change adaptation objectives in combination with other land and aquatic conservation priorities.

# Case Study
# Wicomico County, MD

Impact: Sea Level Rise

Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

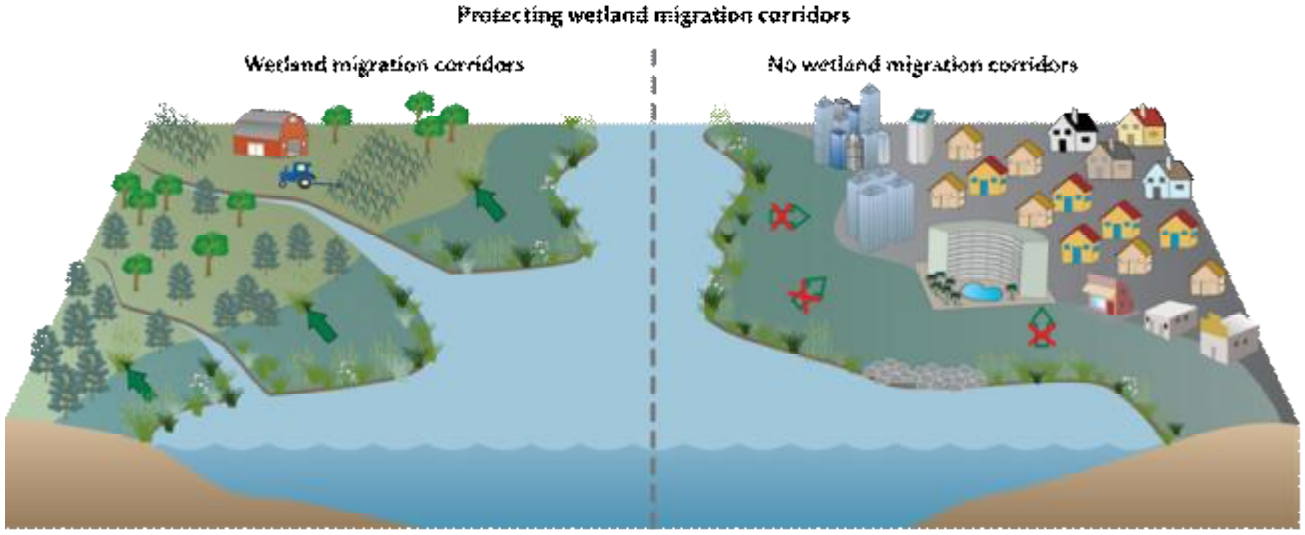



Figure 14. As sea level rises, wetlands may migrate into open spaces such as forests and fields. However, wetlands cannot migrate into areas with man-made barriers such as hardened shorelines and heavy development such as urban, commercial, and residential areas.

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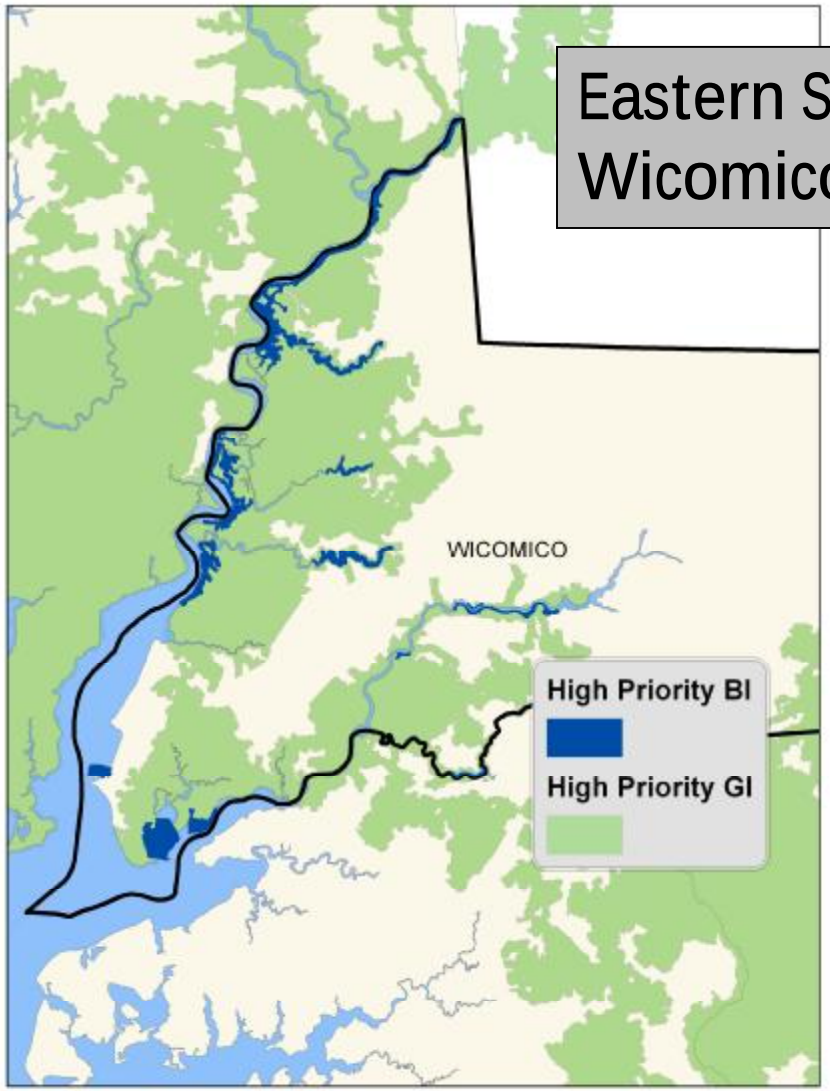

# Case Study
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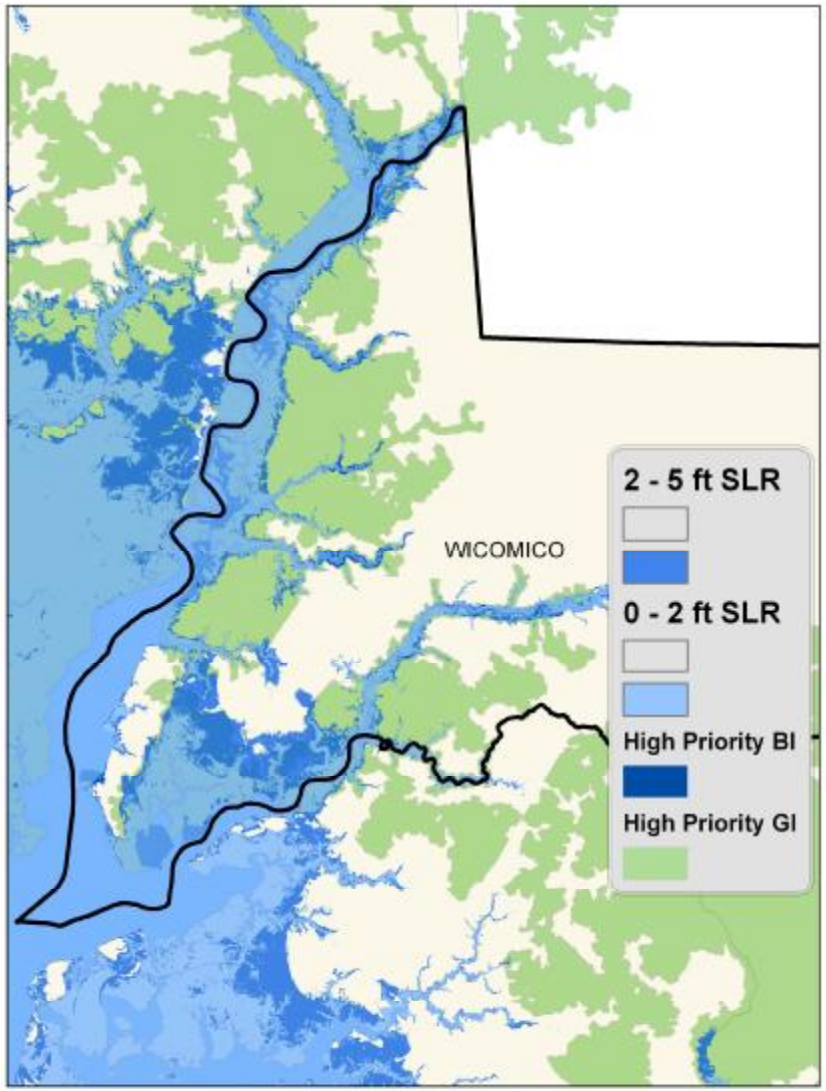
Future Landscape Includes:

- High Priority GI & BI
- 0-5’ Sea Level Rise



# Case Study
# Wicomico County, MD

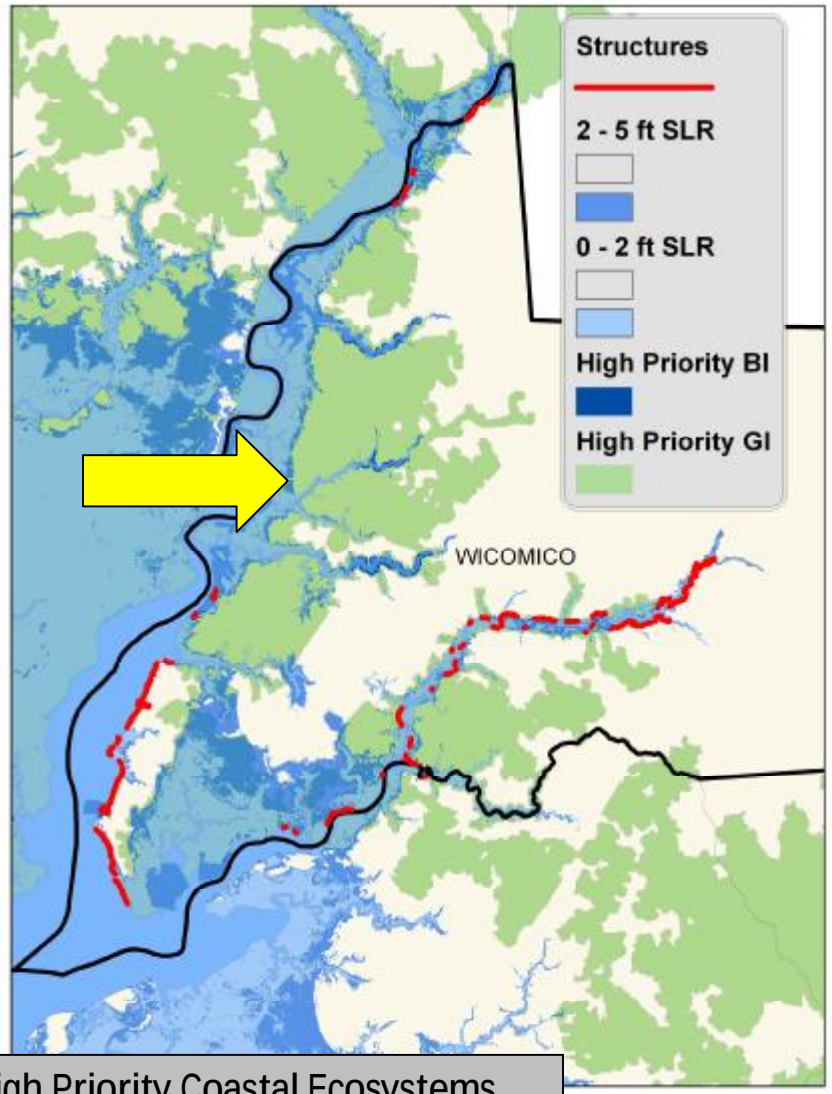
## Coastal Land Criteria

- Shoreline Structures
  - Ø Barrier to inland migration of ecosystems

# Case Study
# Wicomico County, MD

## Criteria

1. Coastal lands with little to no hardened shorelines and other barriers




Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

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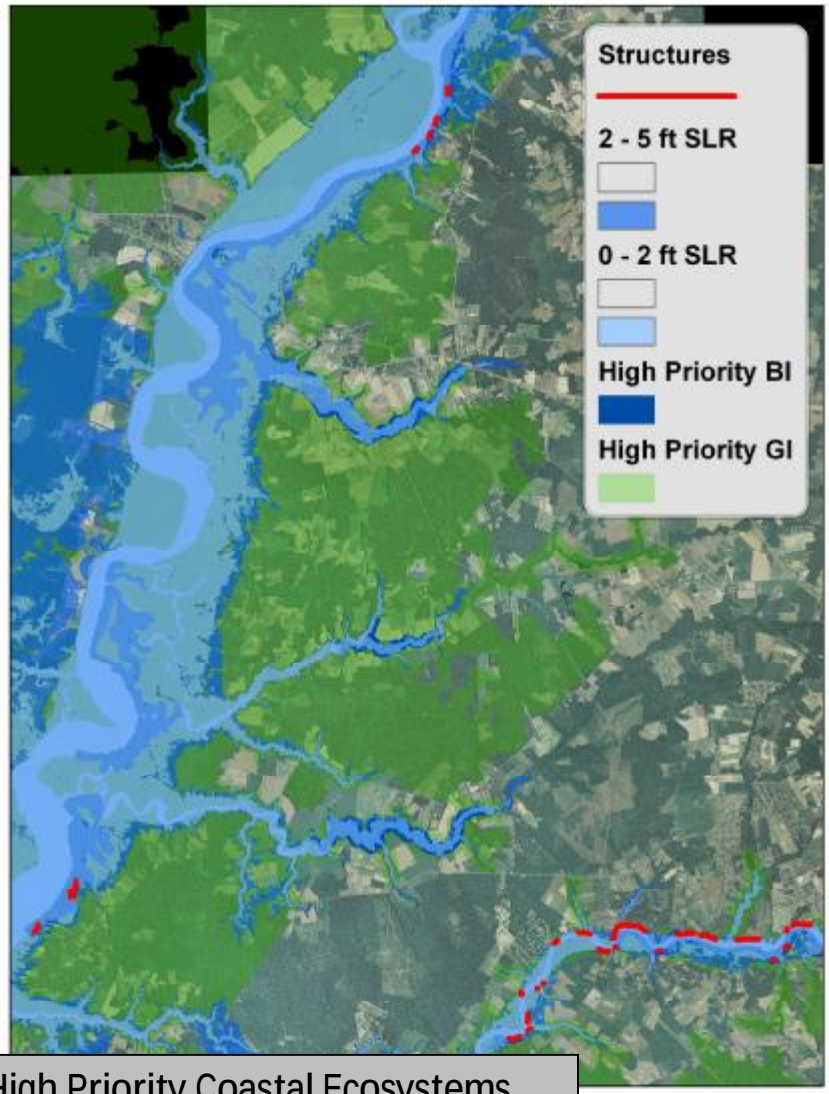



Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

# Case Study
# Wicomico County, MD

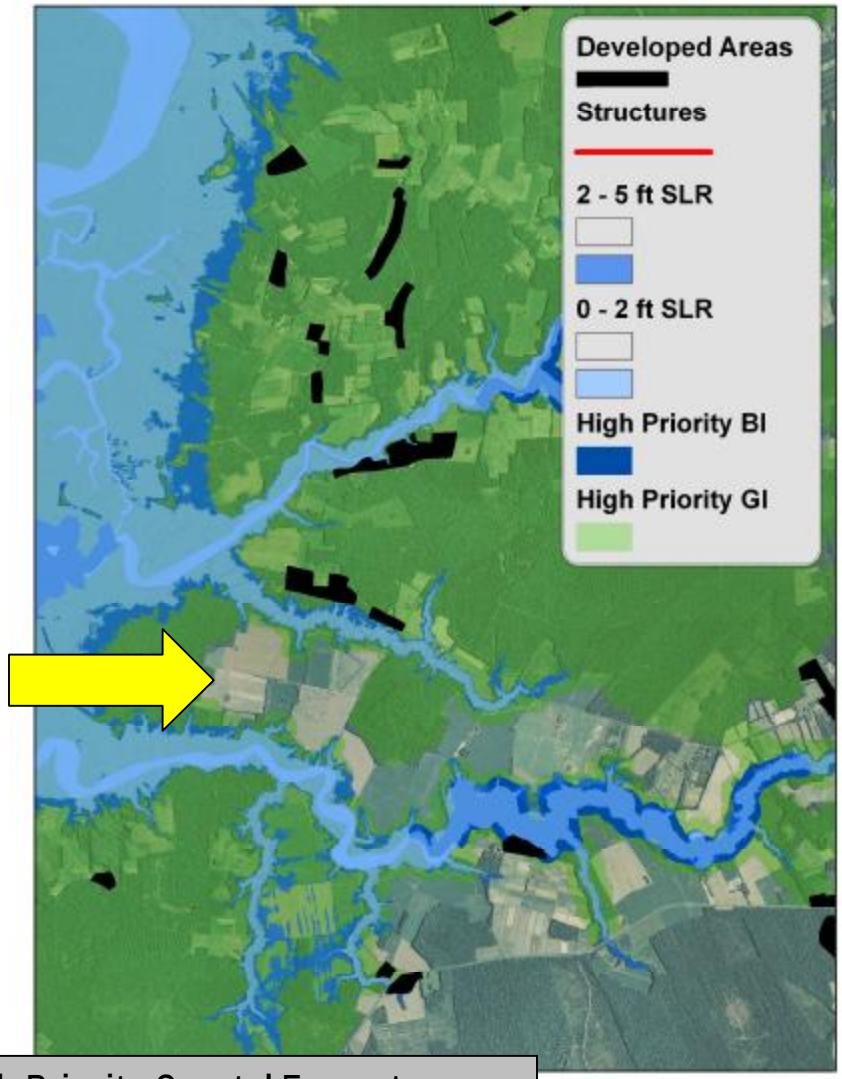
## Coastal Land Criteria

- Developed Land
  - Ø Barrier to inland migration of ecosystems

# Case Study
# Wicomico County, MD

## Criteria

2. Suitable undeveloped uplands under 0-5' sea level rise




Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

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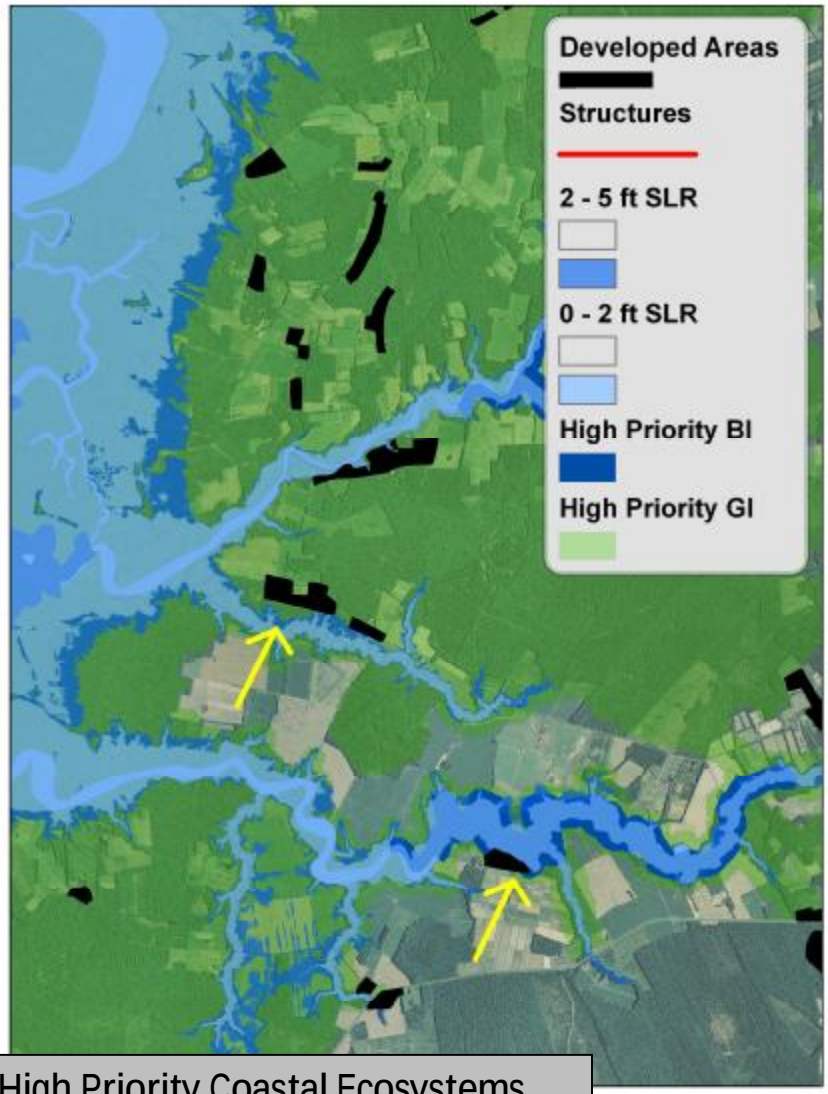



Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

# Case Study
# Wicomico County, MD

## Coastal Land Criteria

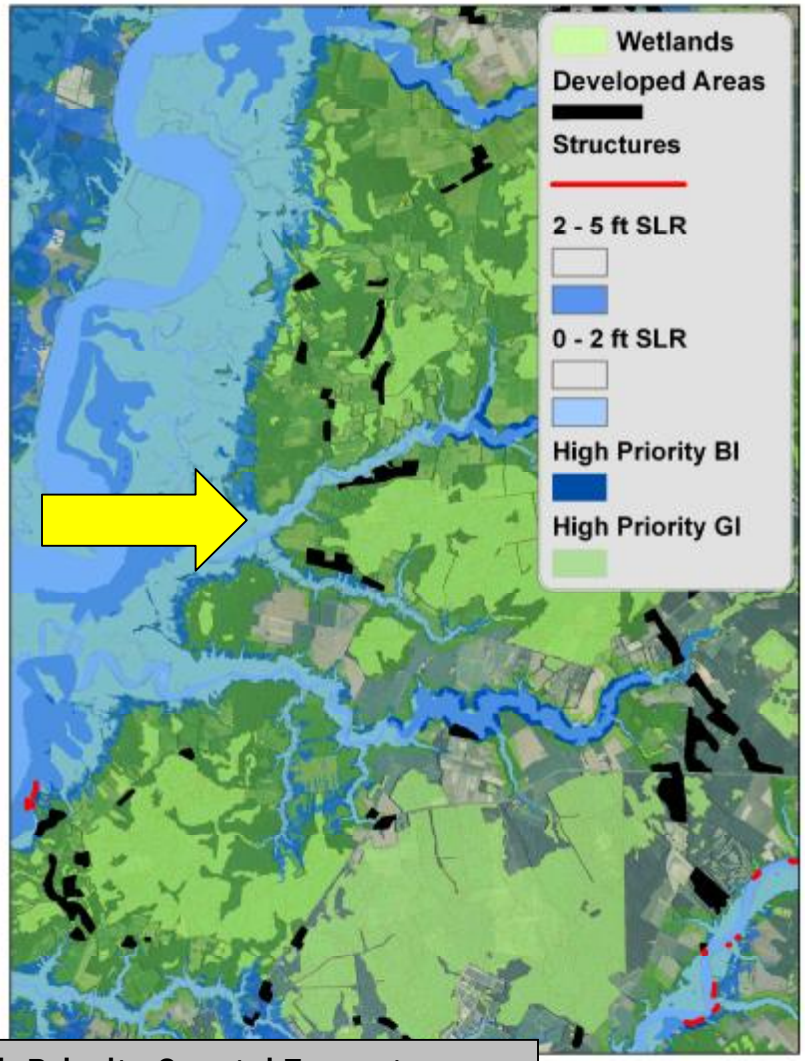
- Intact Coastal Wetlands

  Ø Intact coastal wetlands may help facilitate accretion and recruitment inland

# Case Study
# Wicomico County, MD

## Criteria

3. Intact wetland migration corridors




Adaptation Strategy: Facilitate Landward Movement of High Priority Coastal Ecosystems Subject to Dislocation by Sea Level Rise

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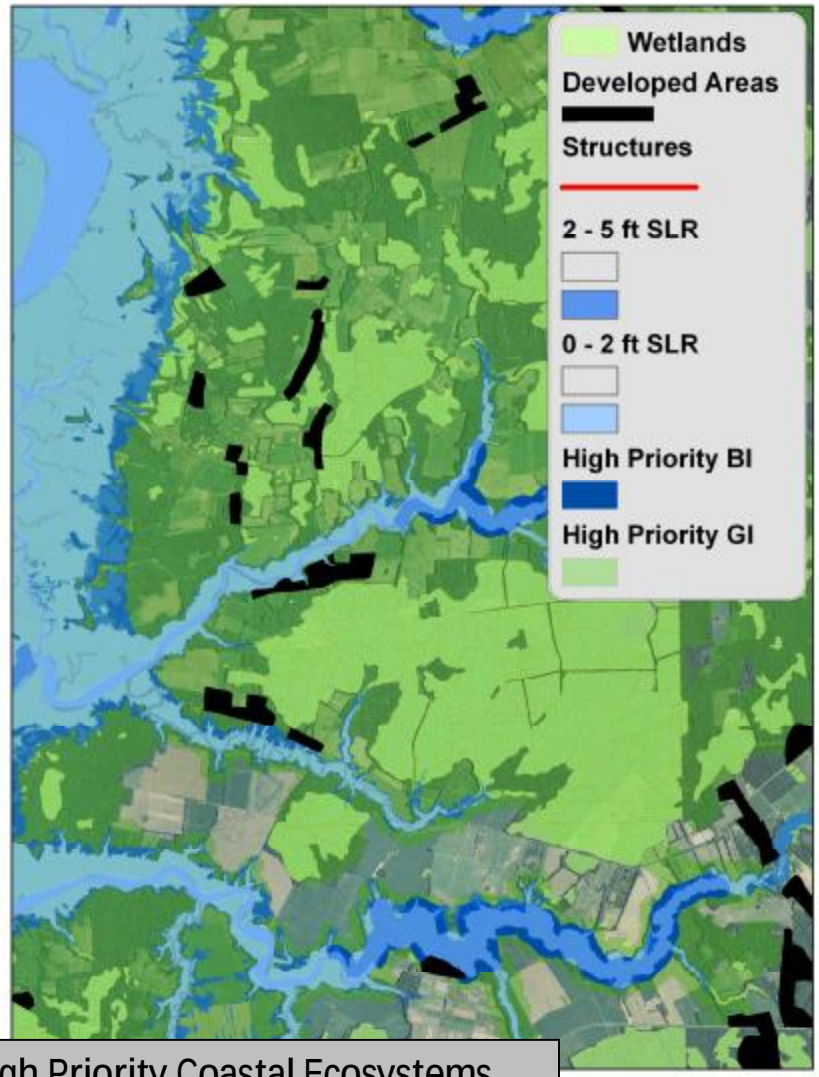


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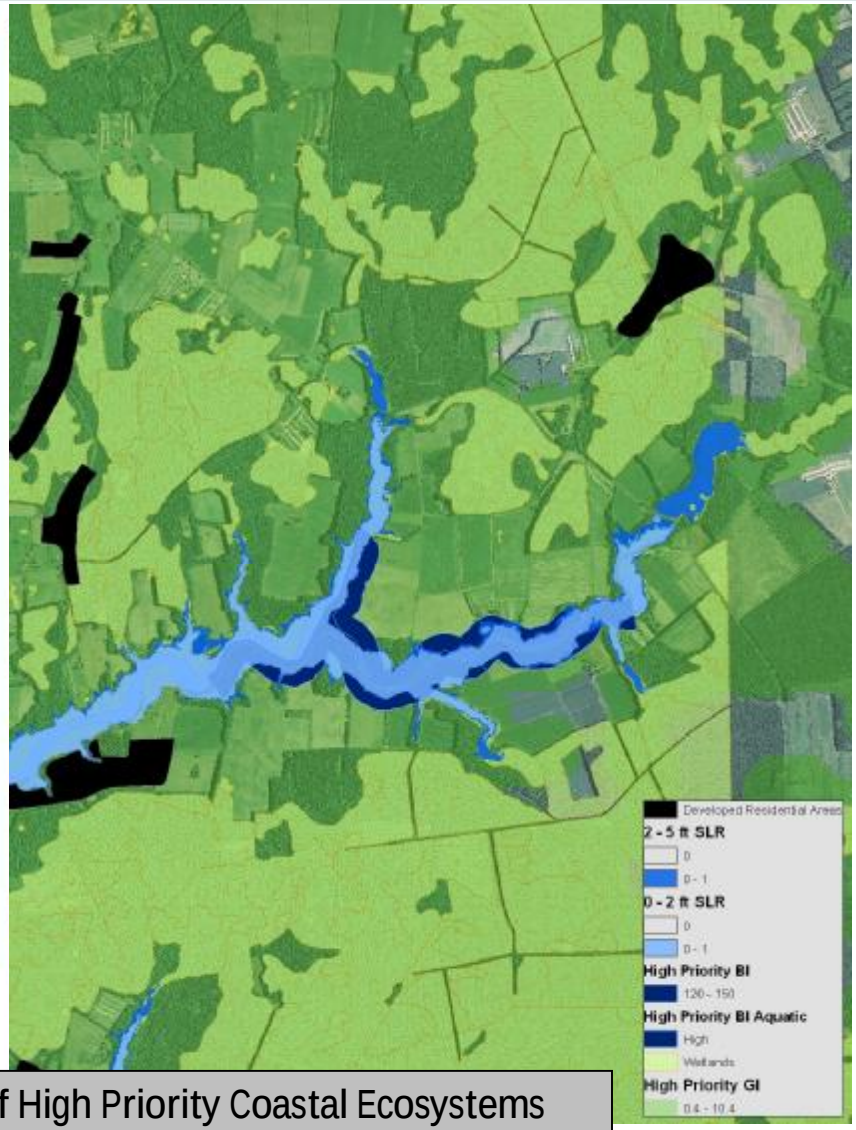


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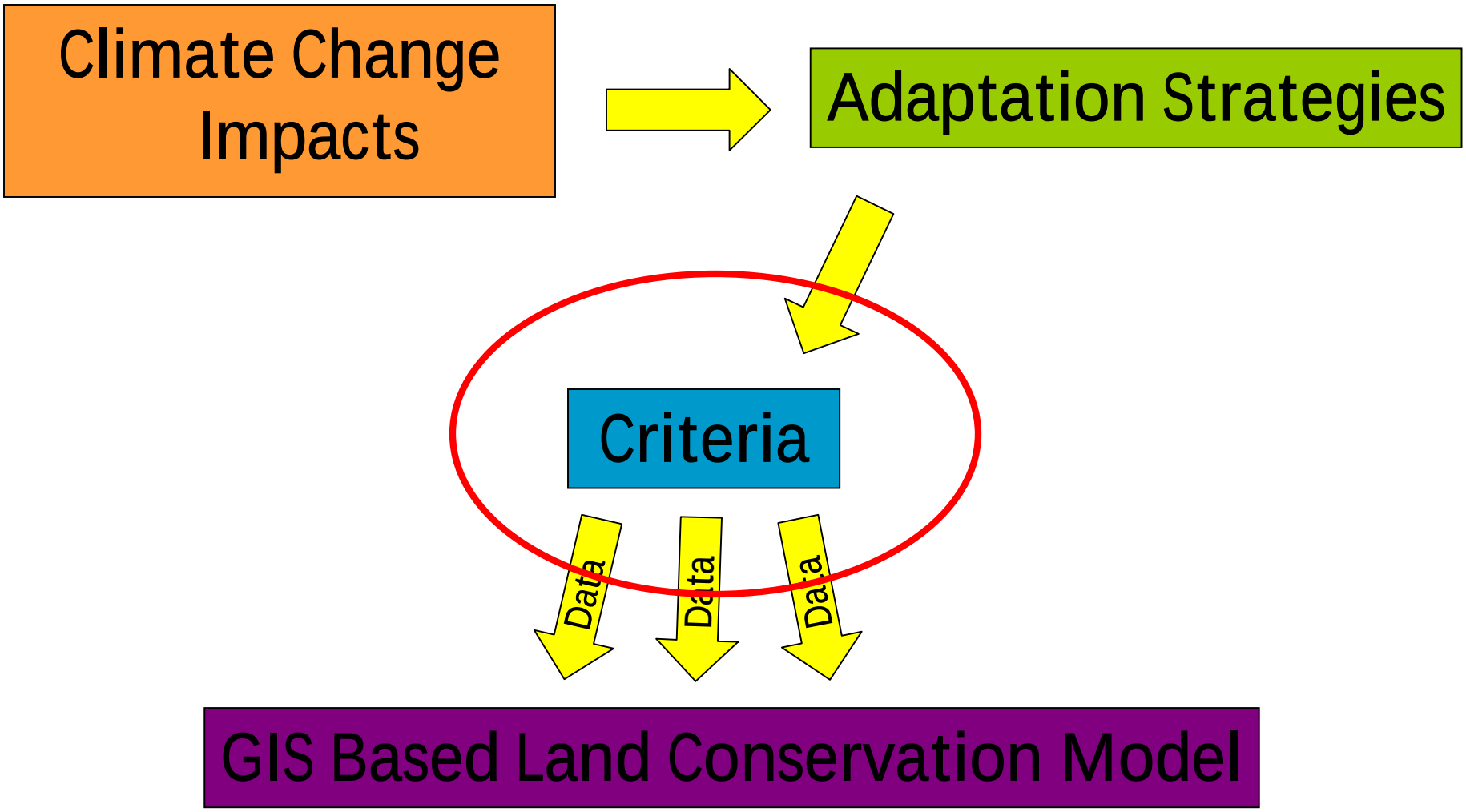
# Adapting Coastal Land Conservation Practices



# The Future is Very Near and Real…

We Must Take Action In order to Safe Guard Key Coastal Habitats for Future Generations by Adapting Land Conservation Practices